Biomimicry and NASA

Janine Benyus, author of *Biomimicry* points out that the natural world contains creatures and plants that are a product of 4.5 billion years of evolution. The Earth is a 4.5 billion-year-old R&D laboratory that solved problems such as how to obtain water in a desert, how to breathe underwater, and how to gather and store sunlight and energy.

Whether intended or unintended, NASA incorporates biomimicry into its projects. We see how nature solves problems or fills a niche, and we imitate it.

Some examples pointed out by Dr. Benyus:

- NASA locomotion for robots used terrestrially or in space: snake-bots, cricket-bots, tuna-bots, pike-bots
- Arthropod imitators (insects, crustaceans, spiders): Rovers that burrow, slither, climb over obstacles
- Trout imitators: Moving toward turbulence for added propulsion
- Porcupine quills: Creating structures that bounce without damage
- How life deploys: Deployable solar cells using folded membranes – based on leaves unfolding from a bud

The best part is that, when you imitate nature, you can end up with answers that create less impact on our resources, are less toxic, self-sustain, and biodegrade. Here are more examples from Dr. Benyus:

- Create color without paint. Bluebirds are really brown. Carotin, in layers, in a matrix of tiny holes (photonic crystals) allows light to come through and amplify, giving the appearance of blue feathers.
- Termites cool their mounds by digging tunnels underground (where the temperature is constant), farming fungus in the tunnels, and funneling the air through a chimney, cooling the air throughout the mound.
- An abalone creates a shell twice as tough as high-tech ceramics by releasing proteins into seawater, causing the calcium carbonate to self-assemble into a mortar.

We can ask the question, "How does life create conditions conducive to life?," as life has already done on this planet. How do you incorporate biomimicry into your life and work? How can you? Dr. Benyus invites us to look at the smallest parts of nature – a leaf, a feather, or a pine cone – and to see what we can create.

Compiled by Linda Sekura 8-2-04